

## ===== WPI =====

TI - CVD based titanium film formation for semiconductor device - by controlling injection electric power, flow rate of hydrogen, argon and titanium chloride gases, chamber internal pressure and plasma

AB - J11040518 NOVELTY - Plasma is formed with  $TiCl_4$ ,  $H_2$  and Ar gas introduced inside a chamber (1) enclosing a Si wafer (W). A Ti film is formed to the hole site of an insulation layer formed on Si film on the wafer by controlling electric power, gas flow rate, wafer temperature, chamber internal pressure and adjusting plasma of the gas so as to form Ti film with a highly selective ratio.

- USE - For forming Ti film on  $SiO_x$  insulating film as a contact or adhesion in a semiconductor device.

- ADVANTAGE - The content ratio contributing to film forming is increased by the Ar ions and the film forming rate is increased by both  $H_2$  gas and Ar gas used in addition to the  $TiCl_4$  gas. A Ti film is formed at the same velocity to the Si of  $SiO_x$  film and the hole sites.

- DESCRIPTION OF DRAWING(S) - The drawing is a sectional view showing the composition of a film forming equipment and the CVD based titanium film formation method. (1) Chamber; (W) Si wafer.

- (Dwg.2/7)

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## ===== PAJ =====

TI - FILM FORMATION OF CVD-TITANIUM FILM

AB - PROBLEM TO BE SOLVED: To provide a film formation method of a CVD-Ti film which can form a Ti film with high step coverage in a fine hole position formed in an insulation film.

- SOLUTION: When a CVD-Ti film is formed in a layer insulation film or an insulation film with a hole formed on an Si wafer or an Si film thereon, an Si wafer W is loaded inside a chamber 1, an inside of the chamber 1 is made specified vacuum atmosphere,  $TiCl_4$  gas,  $H_2$  gas and Ar gas are introduced into the chamber 1, plasma is generated inside the chamber 1 and a Ti film is formed. In the process, flow rate of the gas, a wafer temperature, a pressure inside a chamber and charge power during plasma formation are adjusted to form a Ti film in a hole position at high selectivity to a layer insulation film or an insulation film.

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PA - TOKYO ELECTRON LTD

IN - YOSHIKAWA HIDEKI;KOBAYASHI YASUO;TADA KUNIHIO

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